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the solitary and chain forms of *Cyclosalpa* are given in detail, and an account of the subneural gland in this genus is appended. The paper is an abstract of a dissertation accepted at Johns Hopkins University for the degree of doctor of philosophy.

G. H. P.

Relationships of American and European Mammalian Faunas.

— Mr. A. Smith Woodward concludes a most valuable *résumé* of the history of the mammalian fauna of Europe and America (*Natural Science*, May, 1898) with the following considerations as to the place of origin of the various elements in the two worlds. At the base of the Eocene it is evident that the faunas of the east and the west were essentially identical. As they are traced upwards they gradually diverge.

The first noteworthy difference is the great development of the Condylarthra in America, and the rise in the Eocene of the large specialized Amblypoda, of which only a single genus (*Coryphodon*) has been found in the corresponding fauna of Europe. On the other hand, the still larger hoofed animals of the sub-order Proboscidea seem to have originated in the Old World, and did not reach America until the late Pliocene.

The Perissodactyla—the tapirs, rhinoceroses, and horses—appear to have advanced on a parallel course on the two continents, though in America both the rhinoceroses and the horses became extinct at the close of the Pliocene, the former without acquiring the characteristic horn.

Among Artiodactyla, both the deer and pigs seem to have been approximately parallel in their development in both continents, only differing in some minor branches, which soon became extinct. The camels, however, are clearly American throughout, only wandering into the Old World by Asia in the Pliocene. It is almost equally probable that the oxen originated in the Old World.

Among Carnivora, the Creodonta are both American and European; but on the former continent they only pass upwards into the dogs (*Canidæ*), weasels (*Mustelidæ*), and the aberrant cats of the family *Nimravidæ*, while in Europe they are succeeded, not merely by these families, but also by the *Viverridæ*, *Hyænidæ*, *Felidæ*, and *Ursidæ*. The viverroids and hyænas never reached America, but the true cats and bears arrived on that continent at the close of the Pliocene.

Of the Primates, the primitive lemuroids appeared in the Eocene similarly on both continents; but in North America they soon became extinct, while in the Old World they were followed by the true apes, and still have some specialized survivors.